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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 14. September, 1912. No. 165

A SUGGESTION FOR SUMMER OBSERVATIONS.

Cora H. Clarke.

(Plates 97 to 99.)

Incomplete and imperfect observations on any subject do not enhance the observer's scientific reputation, but they are perhaps of worth by calling to the subject the attention of those whose studies may be of more value. And in the case of grass anthesis, if many persons should happen to make notes on the same grass species, their notes, if agreeing, will give us fixed rules, or, if differing, will show us range of variation in the flowering habits of the species.

With this apology, I offer the result of my own desultory examinations, made in the summer of 1911, having been incited thereto by reading for the first time that, in grasses, "The opening of the flowers caused by the divergence of the two glumes is effected by the lodicules. They become fleshy and succulent and usually spheroidally swollen at base, by means of which they overcome the resistance of the elastic outer glume and move it outward. After fading, which occurs at latest in one to two hours, they shrivel up again into small, thin leaves."

This closing again in "one to two hours" must be one of the hundred lies a lecturer has to tell to make his story straight.[1] Probably it is true for most species, but in *Arrhenatherum elatius* I noted two individual spikelets, the flowers of which kept open twenty-four hours; and two flowers in a marked spikelet of *Poa annua* kept open six hours

[1] A distinguished lecturer at Wood's Hole once remarked: "I never make a straight story in my lecture without feeling I have told a hundred lies."

— both of these, however, were in the house, though the *Poa* was growing in earth. The true test would be to mark individual flowers in natural conditions out of doors — paint, or waterproof ink might be used.

Poa annua is a grass always "on tap." I found the first open flower this year (1912) on April 28, and it will keep in bloom until late fall, and then may be potted and will flower through the winter in the house, while as to time of day, I have found blossoms open out of doors from 3 A. M. (before light) to 6 P. M.[1]

One often finds grass flowers open and not a grain of pollen left in the anthers, which then usually resemble two empty canoes placed back to back. Grasses are wind-fertilized, and Hackel states that they are "usually protandrous, more rarely protogynous (Alopecurus, Anthoxanthum, Spartina)" "The anthers empty most of the pollen at once by turning completely over; when the stigmas project laterally from the pendulous or nodding spikelet they turn upward, and thus are only dusted with the pollen of flowers situated above. Rarely they project from the tip of the spikelet. This occurs in protogynous or monoecious species. The glumes in species of Alopecurus, Anthoxanthum, Phalaris and Phleum open scarcely or not at all during anthesis. In these cases, stigmas and anthers project through a narrow slit."

If I had read the above at the beginning of the summer, it would have saved me many fruitless efforts to find open flowers of *Phleum*. Neither did I find any in *Spartina*, but I found anthers shedding pollen in abundance out of doors, at 10.30 A. M. on a sunny day, and once, bringing a dew-soaked inflorescence into the house at 6 A. M., it shook out the pollen at 10, when the dew had dried.

But the most drenching dew does not seem to hinder the pollen of *Ammophila arenaria* from flying in thick clouds: I found it thus on Aug. 23 at 6.15 A. M. An hour later, returning from my walk, I found the usually trim, terete inflorescence looking positively ragged with the many gaping mouths of the flowers up and down the spikes, the pollen not being all shed, though examining spikes as late as 9 A. M. I found the anthers quite empty. A quotation given by Kunth says "the stigmatic branches do not protrude, and are receptive within

[1] But it flowers most profusely in the early morning — one day in June, at 5 A. M., I counted, on the panicles borne by one root of *Poa annua*, 30 open flowers, there being usually two in the same spikelet.

the still closed glumes, while the undehisced anthers already project slightly from their tips." I did not find the flowers to open readily in the house, though my drawing of the lodicules was made from a spike in a vase [at 6.30 A. M.].

But flowers of *Festuca elatior* do open readily in the house — I noted them at 6, 7 and 8 A. M. and at noon, and those of *Agropyron repens* at 10.30 and 3.30; and out of doors I found them open at 5.30 P. M., back of Magnolia Beach, on a cool, gray day.

The anthesis and pollination of *Arrhenatherum elatius* is fully pictured and described in Kunth, but I was glad to find two panicles, and to see for myself the large lodicules, with unusually long tops.

Elymus virginicus is common at Magnolia, along Raymond St., but through some piece of carelessness, having forgotten the results of previous determinations, I last summer brought it out to *E. canadensis*. Finding flowers open, in a vase in the house at 4 P. M., I drew the lodicules with the scale-like tops fringed. Later, I looked up the Latin description of various lodicules in Kunth's Enumeratio Plantarum, and noticed that he called those of *Elymus canadensis* "non-ciliatae," and those of *E. virginicus*, "ciliatae"; I then compared my Raymond St. plants with previously named mounts in my herbarium, and found them to be really *E. virginicus*.

Oats — *Avena sativa*, grew abundantly by stables and roadsides at Magnolia, and as I passed them, at all hours of the day, I gathered the pretty panicles and looked for open flowers, also standing them in vases about the house, but I never caught a blossom open till the morning of September 12, at 6 A. M., when my eye was caught by one open blossom in a glass in the house, with turgescent lodicules, and a half-split anther caught onto one stigma. But if American-grown Oats behave like European, there seems no reason why I should not have found flowers open very often. Out of a number of observers quoted by Kunth, Godron states that the flowers open between 2 and 4 P. M.; Hildebrand that in dry weather, they open in the afternoon or towards evening, but in unfavorable weather, they remain closed, and pseudo-cleistogamous autogamy takes place; Kirchener says that anthesis begins in the afternoon when the weather is favorable and lasts till evening; Körnicke says, many varieties, besides opening in the P. M. do so also in the A. M. beginning in favorable weather, before 8 A. M. and continuing some hours, but the bulk of the flowers always open after mid-day. De Vries tells us that

"Wheat, barley and oats are self-fertile and do not mix in the field through cross-pollination."

In grass-species that are the same as those of Europe, I look with interest to see if the hours of anthesis given for Europe are the same in America; Kunth names 11 A. M. for *Agrostis*, and on Copley Square at that hour, I gathered a panicle of *Agrostis alba* with open flowers, and taking it to a Botany Class, we had the satisfaction of seeing the tiny, but turgescent lodicules. The much-observed *Dactylis glomerata* is said by one man to open at 6 and 7, by another man, 6 and 9; here, I have found them at 6 and 7 A. M.

By the end of the summer, I had examined only nine or ten of the turgescent lodicules of grass-species belonging to the Sub-family *Poacoideae*, and four or five belonging to that of the *Panicoideae*, an insufficient basis for a theory, yet I noticed that the lodicules of the former had thin, scale-like tops to their turgescent bases, while of the latter the lodicules of *Setaria verticillata*, *Digitaria humifusa* and *D. sanguinalis* were like pebbles, round or oblong, while those of *Echinochloa crus-galli* were broad, and square at the top; fortunately remembering that Dr. Percival Lowell tells us that "nothing is so rash as a general denial, except a particular statement," I looked in Kunth's drawings of lodicules in Enumeratio plantarum, and there found two or three of the *Poacoideae* that had truncate tops, not tapering up into a lanceolate tip — these were the "squamulae in unam connatae" of *Glyceria aquatica* and *Glyceria fluitans*, and the squamulae with ciliate tops of *Andropogon halepensis*.

I found the flowers of *Setaria verticillata* and *S. glauca* open in July at about 6 A. M.; those of *Digitaria humifusa* I found open from 4 to 5 A. M., but think they were all closed by 7 — that, however, was on an intensely hot day (July 4, 1911). From 7 to 8 A. M. the little mouths of *Digitaria sanguinalis* open up and down the freshly emerged "fingers" that have scarcely begun to separate from each other. A quotation from Knuth informs us that the "stigmas protrude simultaneously with the anthers, so that at first only self-pollination is possible." I noticed that the neutral flower has as well-developed turgescent lodicules as the perfect flower.

Flowers of *Echinochloa crus-galli* I found open, in the house, from 8 to 9 A. M., with lodicules so different from those of any other grass-species that I have examined, that I shall seek for the earliest blooming panicle this year, to verify my drawings.

Although to see the lodicules thoroughly requires a compound microscope (binocular preferable) a hand-lens shows their presence, and enables one also to make accurate and useful observations as to hours of anthesis, duration of anthesis, time required for emptying the anthers, and facts about the stigmas. A folding chart might be made of paper ruled in squares, with the hours and half-hours of the day on top, and names of grass-species observed, on the left side, with space for notes as to whether the atmosphere is dry or damp. A v might represent an open flower, dots stand for pollen being shed, and a fringed line represent stigmas in good condition.— suggestions upon which students will soon learn to improve.

NOTE: When I wrote the above account of my last summer's observations on grass anthesis, I hoped it would appear early enough in the season to suggest to others to investigate the interesting subject for themselves. I fear that by the end of September, there will not be many grass-species in bloom, but I am sincerely glad of a delay which enables me to add some of the results of my more recent observations, extending, modifying or reversing those of last year.

I stated that *Poa annua* can be found in bloom at any hour of the day, but I find that by far the greater number of blossoms open in the early morning, say from 3 to 7 A. M. On one plant in my border, I counted about 30 spikelets with open flowers — 2 or 3 in each spikelet.

Last summer, I only once found an oat blossom open; this year, I have found them open often, both in a vase in the house, and out of doors,— the latter was in the afternoon.

Last year I found no open flowers of *Glyceria canadensis;* this year, I found many; the time was 7 A. M. on July 6th. I have also examined the lodicules of *Glyceria grandis, G. borealis, G. acutiflora* and *G. pallida,* all of which species grow at Magnolia, though I do not remember seeing *G. grandis* here before this summer. The lodicules and stigmas of *G. pallida* I could not distinguish from those of *Poa annua,* but the other four have stigmas differing from the usual grass-type, and lodicules square-topped, that is, no uninflated scale-like top. Sometimes, under the microscope, they take the form of those "bracket-fungi" that grow on tree-trunks. I found *Glyceria pallida* with open flowers at 11 A. M.; in the afternoon, many more opened in a vase in the house, and next morning, several were open, the pretty red-brown anthers contrasting pleasingly with the pale green of the spikelets.

The lodicules of *Danthonia spicata* are also of the square-topped type. I found flowers open on July 2nd, at 10 A. M.

When a grass-species begins to bloom, the flowers at the top of the panicle open first, but if the spikelets are many-flowered, anthesis begins with the lowest flower in each spikelet; when each little mouth is closed again, the shrivelled anthers are left outside, so that one can usually tell, by looking at a spike or panicle, even if no flowers are open, whether the plant is coming into bloom or passing out of bloom. On August 14th, I brought home a few young culms of *Andropogon furcatus*; next morning a row of from 4 to 8 little mouths was open in the upper part of each spike, a curling stigma protruded on each side, and a fringe of pendulous golden anthers (3 from each flower) contrasted with the gray and purple color of the grass. Here again I found the flat-topped type of lodicule, the pair meeting in front and then each extending back along the side of the ovary. The pollen was shaken out between 6 and 8 A. M. I have only seen grass-pollen fly in clouds when the grass is touched or jarred,— whether it appears in a visible cloud when the grass is blown upon by the wind, I do not know.

Some grasses seem to open all their flowers at once —*Deschampsia flexuosa*, for instance. On July 3rd at 7 A. M. I found a panicle on which all but one or two flowers were wide open. I suppose that accounts for the species passing by so quickly. *Arrhenatherum*, of which there was an abundance here, this season (1912) also passed all too quickly through its blooming period, and so did *Calamagrostis canadensis*, and many other grasses; per contra *Glyceria pallida* has been in bloom 7 weeks already.

I have examined turgescent lodicules of various species of *Panicum*, e. g., *P. latifolium*, *P. virgatum*, *P. agrostoides*, and *P. capillare*, and find the general plan the same, curving in front, with a flattish top, and a projection extending backward on each side of the ovary, part of each lodicule being outside the edge of the palet and part inside. Kunth describes the lodicules of *P. virgatum* as follows — "Squamulae duae, late cuneatae, apice oblique truncatae et sinuatae subbilobae glabrae, ovario triplo breviores." I found this handsome species at Manchester, Mass., not far from the R. R. Station, growing near salt water; at noon, Aug. 13th, a warm, sunny day, many flowers were open, and on the panicles I took home, I could find a few open flowers all through the next day, though the most abundant anthesis was about

noon (some of the open flowers were the staminate ones, some the fertile). Each had its pair of lodicules; but on the third day, the flowers did not open so well. I notice that grasses with hard, stiff culms do not open their flowers well in the house.

As lodicules lie between the ovary and the lemma, to see them well I turn the lemma back against the pedicel, nip the two in stage forceps and put them under the inch objective of my binocular; then I can twist and turn them about, their appearance varying much according to the angle from which one regards them, also according to degree of turgescence; perhaps this explains why the lodicules of *Digitaria sanguinalis* do not look to me this year as I drew them last year! Then they looked to me like round pebbles, and now they appear square-cornered! But that the neutral flower has a pair of them as well as the fertile, remains an uncontrovertible fact.

Boston, Massachusetts.

Explanation of Plates.

Plate 97.

1. *Poa annua*, lodicules, stamens and stigmas, as seen in the bud.
2. *Poa annua*, lodicules and ovary, in the open flower; one stamen left, with an empty anther; Nov. 17th, 5 A. M. (in pot in house).
3. *Poa annua*, lodicules reduced to scales again; grain nearly ripe; anthers and dried-up stigmas pushed to top of flower.
4. *Festuca elatior*, with turgescent lodicules, ovary, one stamen, and base of two other filaments and of the two styles; Aug. 12th, 7.30 A. M.
5. *Avena*, turgescent lodicules, bristly ovary, base of the two stigmas, with one partly-dehisced anther caught onto one of them; Sept. 12th, 6 A. M.
6. *Ammophila arenaria*, turgescent lodicules; Aug. 20th, 6.30 A. M.
7. *Arrhenatherum elatius*, turgescent lodicules; Aug. 22nd, 10.30 A. M.
8. *Elymus virginicus*, turgescent lodicules; Aug. 6, 4 P. M.

Plate 98.

1. *Setaria verticillata*, cluster of four spikelets, flowers more or less open.
2. *Setaria verticillata*, part of single spikelet, showing turgescent lodicules, styles, stigmas, two anthers, and a bristle; July 6th, 5.30 A. M.
3. *Echinochloa crus-galli*, turgescent lodicules, ovary, bases of two styles, three filaments and the palet; Sept. 16th, 8 A. M.
4. *Echinochloa crus-galli*, a soaked-out flower bud; shows two young, scale-like lodicules, two young stamens, and base of palet.
5. *Digitaria sanguinalis*, turgescent lodicules, etc.; Sept. 12th, 8 A. M.
6. *Digitaria humifusa*, part of spikelet, turgescent lodicules, styles, stigmas, and three empty anthers; July 4th, 5 A. M.
7. *Digitaria humifusa*, part of a raceme, with spikelets more or less open, showing anthers and stigmas.

Plate 99.

1. *Glyceria acutiflora*, lodicules, united into one; ovary, and base of palet; July 2nd, 6 A. M.
2. *Glyceria grandis*, united lodicules, ovary, styles, and base of curious stigmas; July 15th, 5 A. M.
3. *Glyceria canadensis*, ovary, lodicules and base of palet; July 6th, 7 A. M.
4. *Glyceria pallida*, lodicules, ovary and base of palet; July 7th, 4 P. M.
5. *Danthonia spicata*, lodicules, ovary and base of palet; July 2nd, 10 A. M.
6. The same, side view.
7. *Distichlis spicata;* staminate flower; lodicules, base of palet and of the 3 filaments. Aug. 14th (hour not recorded).
8. *Andropogon furcatus*, base of palet, and lodicules embracing the ovary, viewed from above; Aug. 14th, 9 A. M.
9. *Andropogon furcatus*, lodicules, and ovary viewed from the rear or palet-side;
10, 11, and 12. *Panicum capillare*, ovary, lodicules and palet, from different points of view; 10 to 11 A. M.

NOMENCLATORIAL CHANGES REQUIRED BY SOME GRAMINEAE OF THE SEVENTH EDITION OF GRAY'S MANUAL.

(*Continued from page 173.*)

F. Tracy Hubbard.

Panicum Scribnerianum Nash.

Section V, Canon 16, upholds this name when the American Code is followed, but according to Sect. 7, Art. 50 of the "Vienna Code" *P. macrocarpon* Le Conte in Torr. Cat. Pl. N. Y. 91 (1819) which equals *P. latifolium* L. Sp. Pl. 58 (1753) [Cf. Hitchc. & Chase Contr. Nat. Herb. **15** : 314 (1910)] does not render invalid *P. macrocarpon* Torr. Fl. No. & Mid. U. S. 143 (1824), which is the oldest name of the species [cf. Hitchc. & Chase l. c. 283 (1910)]. Consequently *P. Scribnerianum* Nash becomes *P. macrocarpon* Torr.

Panicum macrocarpon Torr. Fl. No. & Mid. U. S. 143 (1824) not Le Conte l. c. (1819). Synonymy in part. *P. Scribnerianum* Nash Bull. Torr. Bot. Cl. **22** : 421 (1895); Hitchc. in Gray Man. ed. 7, 115 (1908); Hitchc. & Chase Contr. Nat. Herb. **15** : 283 (1910).

For complete synonymy cf. Hitchc. & Chase l. c.

Tridens R. & S.

The genus *Tridens* of Roemer and Schultes [Syst. Veg. **2** : 34, 599 (1817)] in its commonly accepted sense is antedated by *Tricuspis* Beauv. Agrost. 77, t. 15, fig. 10 (1812). The generic description of *Tricuspis* is fairly good and its identity is unquestionable. It is commonly cited as a synonym of *Tridens* [in fact it is given as a synonym by Roemer and Schultes l. c. 34] when that genus is separated from *Triodia* R. Br. According to the American Code *Tricuspis* Beauv. is untenable on account of the older *Tricuspis* Pers. Syn. **2** : 9 (1807), but by Sect. 7, Art. 50 of the "Vienna Code" *Tricuspis* Pers. which equals *Crinodendron* Molina, Saggio Chile 179 (1782) [a genus of *Elaeocarpaceae*] does not invalidate *Tricuspis* Beauv.

Beauvois after describing his genus cites *Poa coerulescens* Mich. [should be Michx.] and gives his combination *Tricuspis Novaeborocensis* Nob. without description. According to Ind. Kew. **2** pt. 1, 571 (1895) *Poa coerulescens* Michx. ex Kunth is described in Kunth Enum. Pl. **1** : 319 (1833) in syn., but it also occurs in synonymy in Kunth Rev. Gram. **1** : 108 (1829); in both cases under *Uralepis cuprea* Kunth. In Rev. Gram. there is a plate (t. 68) which agrees very fairly with Beauvois' illustration.

Kunth in Enum. Pl. **1** : 319 (1833) among other synonyms of his *Uralepis cuprea* cites *Poa coerulescens* Michx. [upon which Beauvois bases his genus *Tricuspis*]; *P. seslerioides* Michx. Fl. Bor. Am. **1** : 68 (1803); *P. quinquefida* Pursh Fl. **1** : 81 (1814); *Triodea cuprea* Jacq. Eclog. Gram. **2** : 21, t. 16 (1814) and *Tricupis noveboracensis* Beauv. Agrost. 77 (1812) with a question mark.

Triodia cuprea Jacq. is the name used for the first species of *Triodia* by Watson & Coulter in Gray Man. ed. 6, 657 (1890) while in the first edition we find Prof. Gray using *Tricuspis seslerioides* Torr. with the following synonyms: *Poa flava* L., *P. seslerioides* Michx., *P. quinquefida* Pursh and *Windsoria poaeformis* Nutt. *Tricuspis seslerioides* is given as a synonym of *Triodia cuprea* Jacq. in edition six and this in turn is shown to be a synonym of *Tridens flavus* (L.) Hitchc. Rhodora **8** : 210 (1906). This is the first species under *Tridens* in Gray Man. ed. 7, 149 (1908).

This chain of equivalents shows conclusively that the type species of *Tricuspis* Beauv. is unquestionably the same as *Tridens flavus* (L.) Hitchc. and consequently the older *Tricuspis* Beauv. (1812) replaces *Tridens* R. & S. (1817).

Tricuspis Beauv. Agrost. 77, t. 15, fig. 10 (1810); Gray Man. 589 (1848) in part, excl. § 2 *Triplasis*. *Tridens* R. & S. Syst. Veg. **2** : 34, 599 (1817); Hitchc. in Gray Man. ed. 7, 149 (1908). *Windsoria* Nutt. Gen. No. Am. Pl. **1** : 70 (1818). *Triodia* R. Br. § 1 as used by Watson & Coulter in Gray Man. ed. 6, 657 (1890).

Tricuspis **flava** (L.) comb. nov. Synonymy in part: *Poa flava* L. Sp. Pl. 68 (1753). *P. seslerioides* Michx. Fl. Bor. Am. **1** : 68 (1803). *Tricuspis novaeborocensis* Beauv. Agrost. 77, t. 15, fig. 10 (1812). *Poa quinquefida* Pursh Fl. **1** : 81 (1814). *Triodia cuprea* Jacq. Eclog. Gram. **2** : 21, t. 16 (1814); Watson & Coulter in Gray Man. ed. 6, 657 (1890). *Tridens quinquefida* R. & S. Syst. Veg. **2** : 599 (1817). *Tricuspis seslerioides* Torr. Fl. No. & Mid. U. S. 118 (1824); Gray Man. 589 (1848). *Tridens flavus* (L.) Hitchc. Rhodora **8** : 210 (1906); Hitchc. in Gray Man. ed. 7, 149, fig. 146 (1908).

Tricuspis stricta (Nutt.) Gray in Proc. Acad. Sci. Phila. **1862** : 335 (1863). Synonymy in part: *Windsoria stricta* Nutt. in Trans. Am. Phil. Soc. **5** : 147 (1837). *Triodia stricta* Benth ex Vasey Ill. No. Am. Grasses, **1** pt. 2, t. 38 (1891). *Tridens strictus* (Nutt.) Nash in Small Fl. So. E. U. S. 143, 1327 (1903); Hitchc. in Gray Man. ed. 7, 149 (1908).

Glyceria Torreyana (Spreng.) Hitchc.

Since the preparation of his manuscript for the seventh edition of Gray's Manual Prof. Hitchcock has been abroad and has made extensive studies of the types of American grasses. This has thrown new light on a number of species and has made the change of certain names necessary. *G. Torreyana* (Spreng.) Hitchc. is an instance of this. A study of the type specimen of *Panicum melicarium* Michx. Fl. Bor. Am. **1** : 50 (1803) has shown it to be what has commonly been known as *G. elongata* Trin. in Mem. Acad. St. Petersb., ser. 6, **4** pt. 2, 58 (1836) [cf. Hitchc. Contr. Nat. Herb. **12** : 149 (1908)]. *G. elongata* Trin. has been reduced to a synonym of *G. Torreyana* (Spreng.) Hitchc. in Rhodora **8** : 211 (1906). Consequently as Michaux's name is the oldest we must accept it for our species.

Glyceria **melicaria** (Michx.) comb. nov. Synonymy in part: *Panicum melicarium* Michx. Fl. Bor. Am. **1** : 50 (1803). *Poa Torreyana* Spreng. Neue Entdeck. **2** : 104 (1821). *Poa elongata* Torr. ex Spreng. l. c. 104 (1821) in syn. *G. elongata* (Torr.) Trin. in Mem. Acad.

St. Petersb., ser. 6, **4** pt. 2 (Gram. Suppl.) 58 (1836); Gray Man. 593 (1848); Watson & Coulter in ed. 6, 667 (1890). *Panicularia elongata* (Torr.) Ktze. Rev. Gen. **2** : 783 (1891). *Glyceria Torreyana* (Spreng.) Hitchc. Rhodora **8** : 211 (1906); Hitchc. in Gray Man. ed. 7, 158 (1908). *Panicularia melicaria* (Michx.) Hitchc. Contr. Nat. Herb. **12** : 149 (1908).

Hystrix Moench.

Unfortunately the generic name was changed from *Asprella* Willd. of the sixth edition of the Manual to *Hystrix* Moench in the seventh. While Willdenow was not the oldest authority for the name *Asprella* or *Asperella*, as it should be spelled, his genus stood for the same plants as the older *Asperella* Humb. in Roem. & Usteri Mag. **7** : 5 (1791). According to the American Code *Asperella* Humb. is invalidated by the older *Asprella* Schreb. in L. Gen. Pl. ed. 8, **1** : 45 (1789). *Asprella* Schreb., however, equals *Homalocenchrus* Mieg. in Act. Helv. Phys-Math. **4** : 307 (1760) which in turn is a synonym of *Leersia* Sw. Prodr. 21 (1788). *Leersia* Sw. is one of Harms' list of *nomina conservanda*. Consequently *Asprella* Schreb. does not invalidate *Asperella* Hubm. (Sect. 7, Art. 50 of the "Vienna Code.").

Humboldt goes into a lengthy discussion of *Elymus hystrix* L. Syst. Pl. ed. Reich. **1** : 234 (1779) which is the same as *E. hystrix* L. Sp. Pl. 560 (1753) and points out wherein this species differs from the genus *Elymus* L. He forms his genus correctly and gives a species *A. hystrix* basing it on *Elymus hystrix* L. Syst. Pl. ed. Reich. **1** : 234 (1779). Furthermore he refers to the older *Asprella* Schreb. and states that Schreber informs him that his (Schreber's) genus is a synonym of *Homalocenchrus* Mieg.

Asperella Humb. in Roem. & Usteri Mag. **7** : 5 (1790) not Schreb. l. c. (1789). *Hystrix* Moench Meth. 294 (1794); Hitchc. in Gray Man. ed. 7, 170 (1908). *Asprella* Willd. Enum. Pl. Hort. Berol. 132 (1809); Watson & Coulter in Gray Man. ed. 6, 674 (1890). *Gymnostichum* Schreb. Beschr. Gräs. **3** : 127, t. 47 (1810); Gray Man. ed. 2, 571 (1856); ed. 5, 639 (1867). *Elymus* § *Gymnostichum* Gray Man. 604 (1848). ? *Stenostachys* Turcz. in Bull. Soc. Natural. Mosc. **35** pt. 2, 330 (1862).

Asperella hystrix (L.) Humb. in Roem & Usteri Mag. **7** : 5 (1790). Synonymy in part: *Elymus hystrix* L. Sp. Pl. 560 (1753);

Gray Man. 604 (1848). *Hystrix patula* Moench Meth. 294 (1794); Hitchc. in Gray Man. ed. 7, 170 (1908). *Asprella Hystrix* Willd. Enum. Pl. Hort. Berol. 132 (1809); Watson & Coulter in Gray Man. ed. 6, 674 (1890). *Gymnostichum Hystrix* Schreb. Beschr. Gräs. **3** : 127, t. 47 (1810); Gray Man. ed. 2, 571 (1856); ed. 5, 639 (1867). *Hystrix Hystrix* Millsp. Fl. W. Va. 474 (1892); Nash in Britt. Man. ed. 3, 158 (1907).

Cambridge, Massachusetts.

THE INLAND VARIETY OF SPIRAEA TOMENTOSA.

M. L. Fernald.

In looking over a package of plants from Wisconsin I was recently impressed with the aspect of a specimen labeled *Spiraea tomentosa* L. In the almost simple and somewhat remote branches of its inflorescence it contrasted with the common form of the species in the Atlantic States, where the branches of the inflorescence are mostly compound, bearing the flowers often in small glomerules so closely crowded as to give the whole thyrsus a very dense appearance. Examination of all the material at hand showed that generally on the Coastal Plain and in the Atlantic States *Spiraea tomentosa* agrees in having the branches of the panicle densely flowered so that it is difficult to see distinctly the individual pedicels; while the material from the Appalachian Mountain system (West Virginia, North Carolina and South Carolina) as well as that from Wisconsin and Minnesota and a single sheet from southeastern Virginia agree in having the flowers less crowded so that the pedicels are distinctly visible and, though in very young material it is naturally difficult to make out this character, it is readily determined in all flowering and fruiting specimens. Another character seems to accompany that of the inflorescence. In all the fruiting material from the Coastal Plain and from the lower levels of the coastal States the follicles are so densely lanate that only in old or weather-beaten specimens can the surfaces of the follicles be seen; but in all the fruiting specimens of the more inland plant, even in inflorescences with the lowest branches still in anthesis, the com-

paratively short (not lanate) tomentum is promptly deciduous so that the lustrous and glabrate surfaces of the follicles are apparent. Attempts to find other characters have failed for in foliage the two plants closely simulate one another, the leaves of both varying in outline from lanceolate to ovate-oblong, with the tomentum of the lower surface from white to rufous; and occasional individuals from the coastal region have an open inflorescence and distinct pedicels but lanate follicles. The writer therefore does not feel justified at present in treating the plants as distinct species; but as geographic varieties they are well marked and deserving of recognition.

Judging from the Linnean description of *Spiraea tomentosa* which came from Philadelphia (*Kalm*) and was compared with *S. salicifolia* in the following terms: *Differt a praecedenti* . . . .racemo *terminali composito densiori longiori*," [1] there is no question that he meant the densely flowered shrub of the Coastal Plain and adjacent regions; but the Plukenet plate of "*Ulmaria pentacarpos, integris serratis foliis parvis subtus incanis, virginiana*," [2] cited by Linnaeus as belonging to *Spiraea tomentosa* has the open inflorescence and slender pedicels of the more inland shrub.

In his *New Flora* Rafinesque divided *Spiraea tomentosa* into five species with the characteristic comment: "All the above sp. agree in nothing but the tomentous leaves beneath, to deem them all varieties would be preposterous, as no character including them all could be found." Besides true *S. tomentosa* Rafinesque defined *S. ferruginea* with "flowers subsessile"; *S. glomerata* with "flowers subsessile glomerate"; *S. parvifolia* with "panicle spicate glomerate, flowers sessile"; and *S. rosea* with "panicle lax, peduncles [pedicels] as long as calix — West Kentucky to Alabama, disc. by Mrs. Holley, a beautiful shrub with fine rosate flowers, it deserves to be deemed a peculiar sp. by narrow leaves not white beneath, and lax rose flowers." [3] From the description and the range of Rafinesque's *S. rosea* there can be no question that he had the more loosely flowered extreme of *S. tomentosa*, with glabrate follicles; but the shrub cannot be separated from typical *S. tomentosa* "by the narrow leaves not white beneath" since the foliage varies in both these characters as much as that of true *S. tomentosa;* and, as already stated, the characters of the in-

[1] L. Sp. Pl., 489 (1753).
[2] Pluk. Alm., 397, t. 321, f. 5.
[3] Raf. New Fl., iii. 62, 63 (1836).

florescence, pedicels and follicles, although ordinarily well marked, show such transitions as to indicate that *S. rosea* is an extreme variety of *S. tomentosa* rather than a distinct species. It should be called

Spiraea tomentosa L., var. **rosea** (Raf.) n. comb. *S. tomentosa* L. Sp. Pl. 489 (1753) as to the Plukenet plate. *S. rosea* Raf. N. Fl. iii. 62 (1836).— The following specimens are characteristic. West Virginia: Elkins, Randolph Co., *Greenman*, no. 188. North Carolina: Biltmore, *Biltmore Herb.* no. 1247*b*. South Carolina: definite station not given, *M. A. Curtiss.* Wisconsin: Milwaukee, *Lapham*, Polk Co., *C. F. Baker;* Camp Douglas, *E. A. Mearns*, no. 336. Minnesota: St. Paul, *Hale*; Chicayo Co., *B. C. Taylor.*

Gray Herbarium.

SISYMBRIUM OFFICINALE IN THREE STATES.

Sidney F. Blake.

My first meeting with the typical form of *Sisymbrium officinale* (L.) Scopoli was on 13 July, 1910, when I collected three plants (sheet 1295, my herb.) along a railroad at St. Paul, Minnesota. Not recognizing its identity at the time, I failed to note whether other individuals of the species were present. So far as I am aware, the typical form has not been reported from the state since the difference between our two forms was first pointed out by Dr. Robinson some years ago.

Since that time I have twice collected the plant in Stoughton, Massachusetts. On 4 July, 1911, a single plant, growing with many of var. *leiocarpum* DC., was collected on a dump (sheet 2823). On 13 July, 1912, just two years after my first meeting with the species, four specimens were taken, found, together with many glabrous-fruited ones, in dry soil in a house-yard, perhaps a mile from the dump at which it had previously been taken.

On 27 July, 1911, Mrs. N. F. Flynn showed me at Starr Farm, Burlington, Vermont, a colony of Hedge Mustard in which she had noticed three days before a plant or two with pubescent pods. Going over the colony more carefully, we counted some forty-eight plants of

true *S. officinale*, which according to my notes "far outnumbered the variety *leiocarpum* which was also present." A number of plants were collected. This occurrence, the first indubitable one for the state, led me to watch for the plant thereafter, and I was rewarded by two more "finds," though of very small colonies. On 30 July, in a pasture in Shelburne, not far from Shelburne Pond, I found and collected three plants of the type. I do not recall that any individuals of the variety were present. On 2 August a solitary plant (sheet 3580) was taken in a field near a farmhouse in Colchester, near Barney Point. All these Vermont records have been briefly published by Mrs. Flynn in Bull. 7, Vermont Botanical Club, p. 16, 17 (May, 1912).

In a comparison of the twenty-six plants of *Sisymbrium officinale* now in my possession with a number of specimens, mostly freshly picked, of var. *leiocarpum*, other differences than the pod-character have appeared. In the first place, in *S. officinale* the pedicels and axis of the main spike-like inflorescence, as well as of the usually horizontal lateral branches (which in both forms so generally come off at or above the middle of the stem, except in case of an injury to the main axis lower down,— in which event several ascending branches develop from the upper leaf axils, much as in *Lactuca* under similiar conditions,— that one of the St. Paul specimens, only 25 cm. high, with four well developed branches in its first five cm. of height, seems worthy of notice on this account) are more or less densely pubescent with the same short spreading hairs as are the pods. In var. *leiocarpum* the pedicels, like the pods, are glabrous, while the flowering axes are glabrous except for a few scattered enlarged retrorse hairs with swollen usually purplish bases, reminding one of miniature *Rubus* prickles (which also occur in the type, among the much more numerous smaller hairs). Similiar hairs occur on the main stem in both forms, but in true *S. officinale* they are again intermixed with smaller hairs, far outnumbering them, similar to those on the pods.

A few further differentiae of more doubtful import may be mentioned. The runcinate lower leaves of both forms are indistinguishable, but in *S. officinale* the hastately three-lobed, or even unlobed and linear-lanceolate, leaves of the flowering parts are appressed-pubescent, sometimes densely so, above and beneath, whereas the variety has these leaves glabrous or with a few hairs on the lower surface, rarely on the upper. Again, none of the *S. officinale* has the purple of the stem so extensive as it very often is in the variety, the

color being present only at its base, although in this respect the plants do not differ from some specimens of the variety. Finally, *S. officinale* seems, so far as my experience goes, to be the smaller plant of the two; my tallest individual is only about 50 cm. high, while the variety is almost always taller than this. Whether this character would hold in a larger series of specimens I am not able to say.

Stoughton, Massachusetts.

A Purple-fruited Ash.— In June, 1911, Mrs. H. K. Morrell sent from Gradiner, Maine, a branch of *Fraxinus americana* L. with deep reddish-purple fruit with a query as to its identity and the remark that "ours about the house have green wings and these red." The present writer then made it a point to watch the White Ash in the neighborhood of Boston and, although the majority of trees bear green or greenish-yellow fruit, occasional colonies were found having the fruit a beautiful purple, which renders the trees conspicuously different in aspect from the ordinary greenish-fruited form. The purple-fruited form seems not to have been distinguished but it is so pronouncedly different in aspect that it deserves the designation:

Fraxinus americana L., forma **iodocarpa**, n. f., fructibus purpureis. — Maine: Gardiner, June 13, 1911 (*Jennie M. H. Morrell*). Massachusetts: Winchester, June 17, 1911 (*F. F. Forbes and M. L. Fernald*). — M. L. Fernald, Gray Herbarium.

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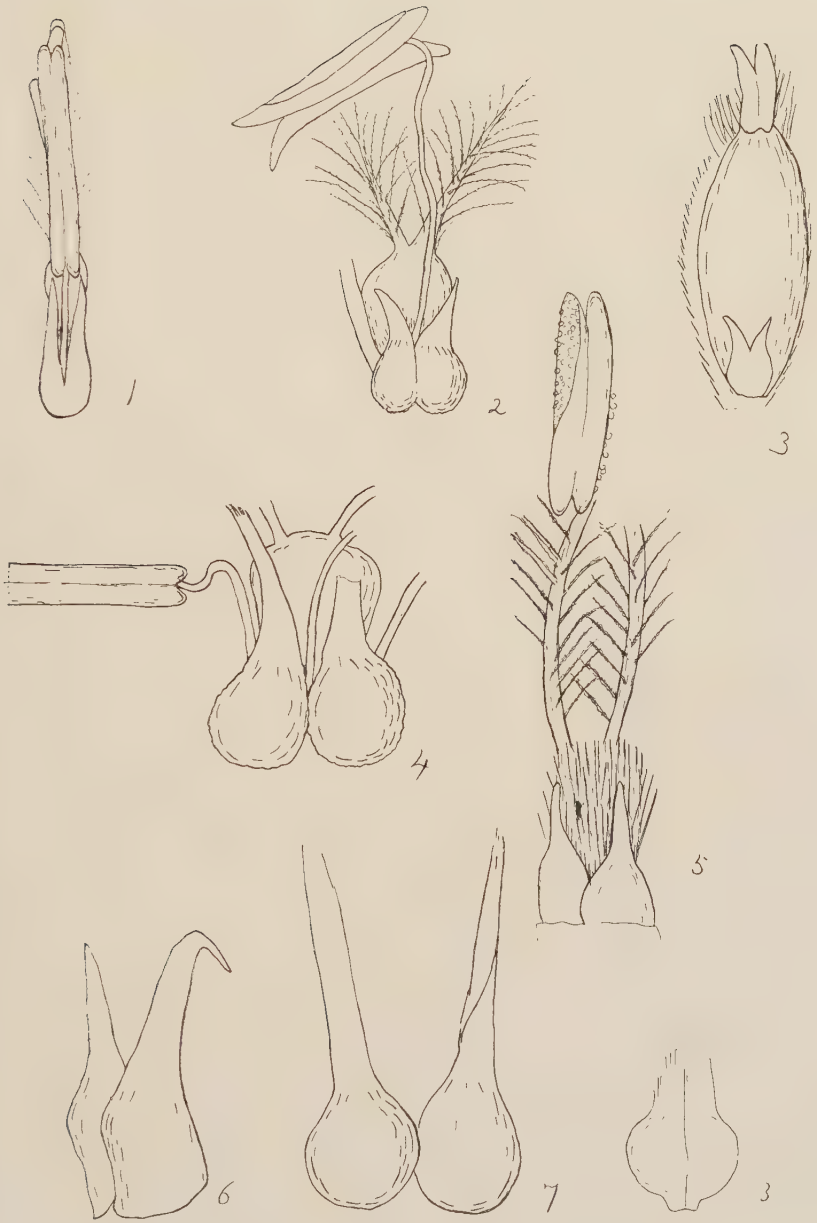

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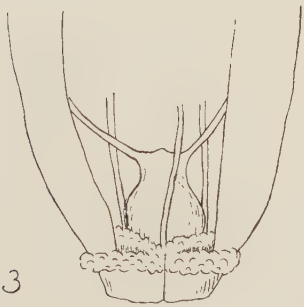
LODICULES OF GRASSES.



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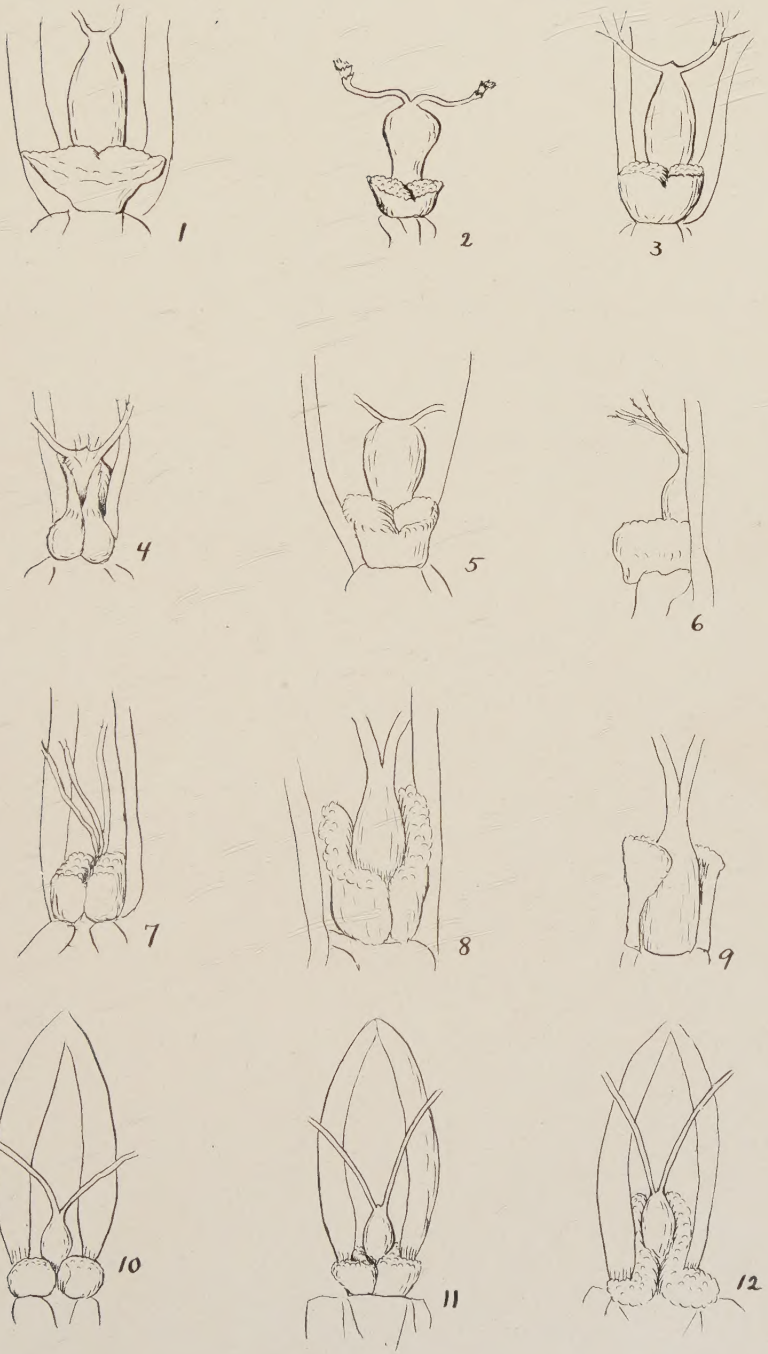

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